

FIG. 1

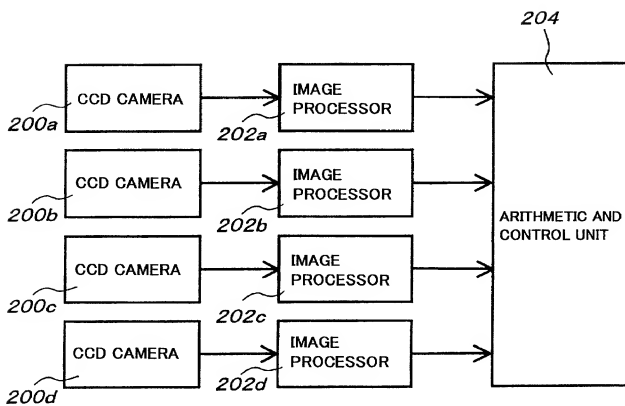


FIG. 2

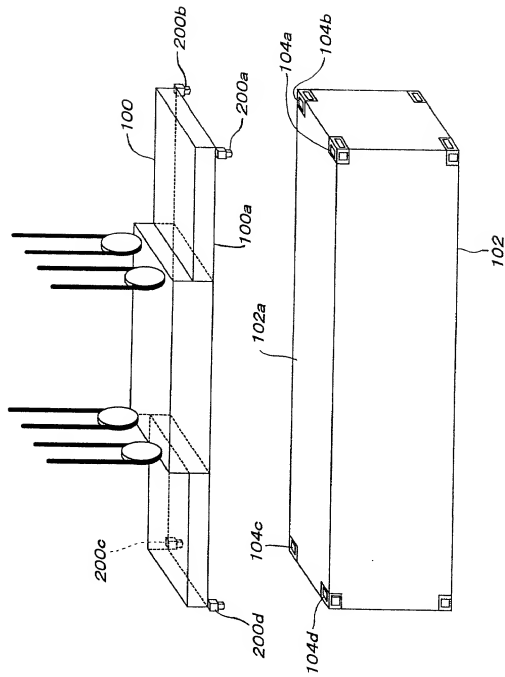


FIG. 3

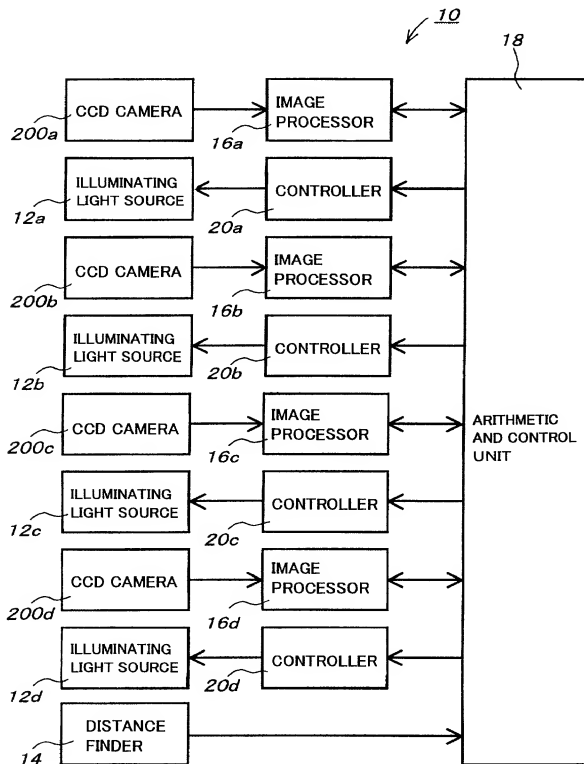


FIG. 4

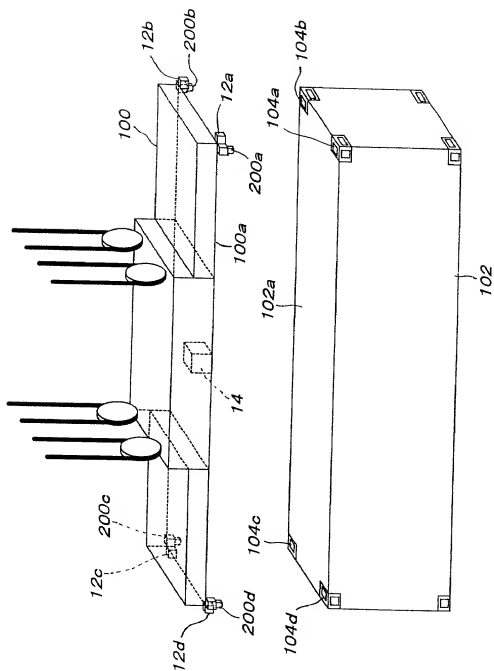
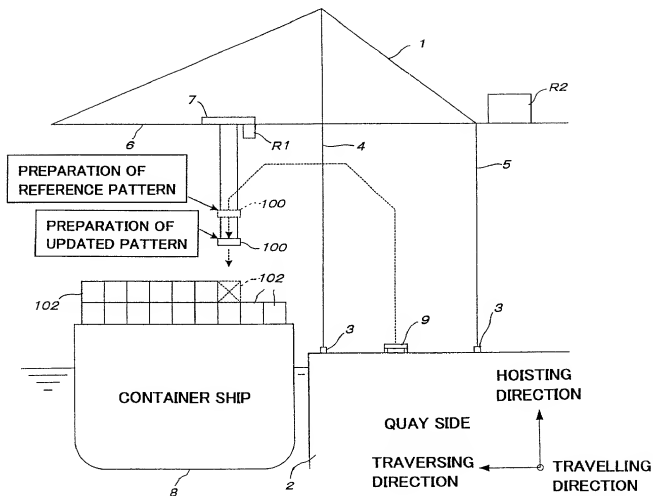
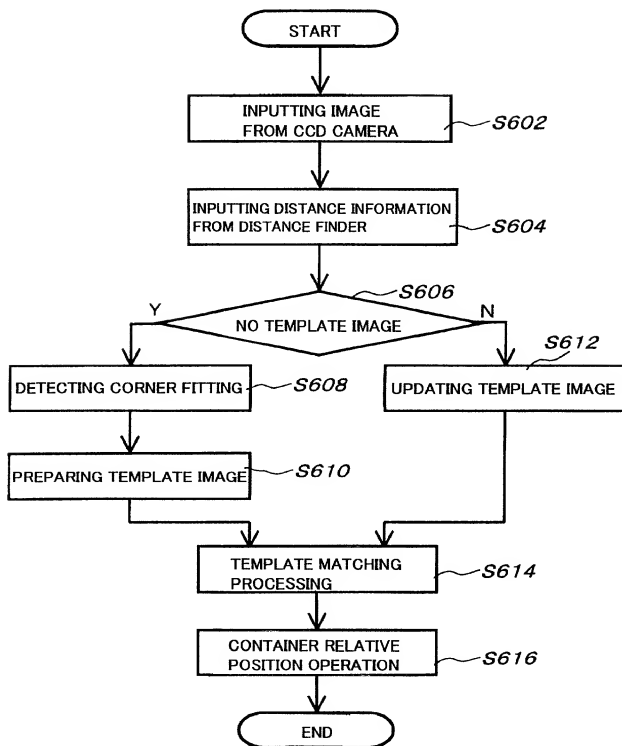


FIG. 5



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FIG. 6



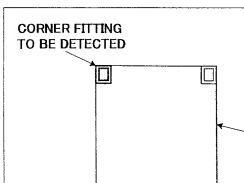


FIG. 7(a)

(a) ORIGINAL IMAGE

CONTAINER LOAD CARGO

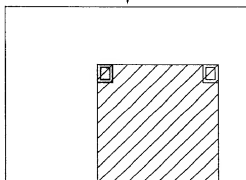


FIG. 7(b)

(b) DETECTION RESULT
ON CONTAINER
UPPER SURFACE

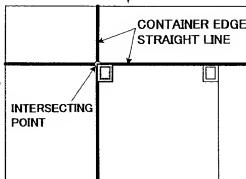


FIG. 7(c)

(c) RESULTS OF LINEAR
APPROXIMATION OF
CONTAINER EDGE AND
INTERSECTING
POINT DETECTION

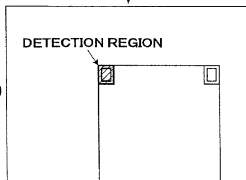
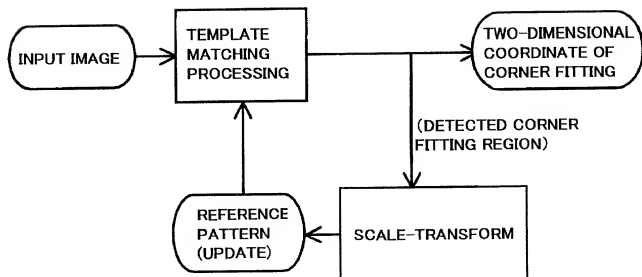


FIG. 7(d)

(d) RESULT OF CONTAINER
FITTING DETECTION

→ 
STORAGE AS TEMPLATE IMAGE
(REFERENCE PATTERN)

FIG. 8



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FIG. 9

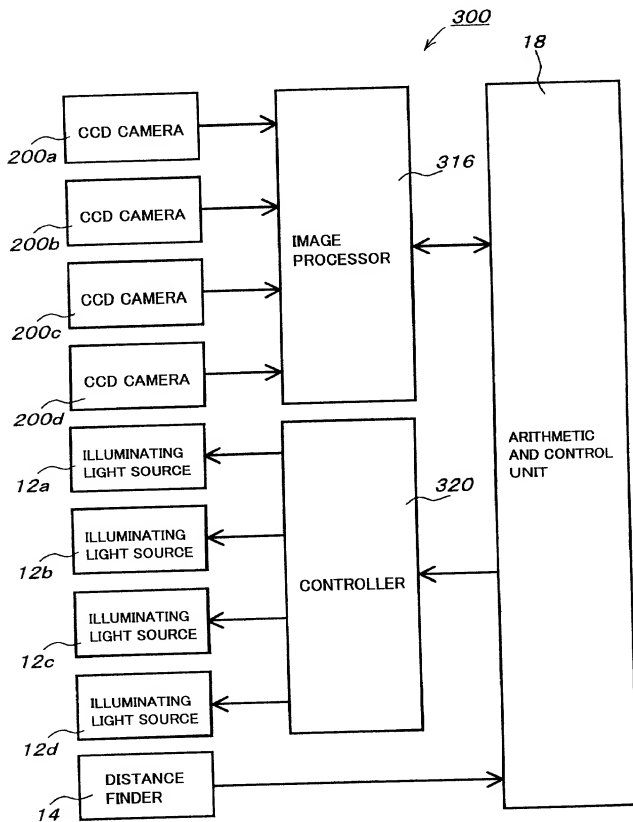


FIG. 10

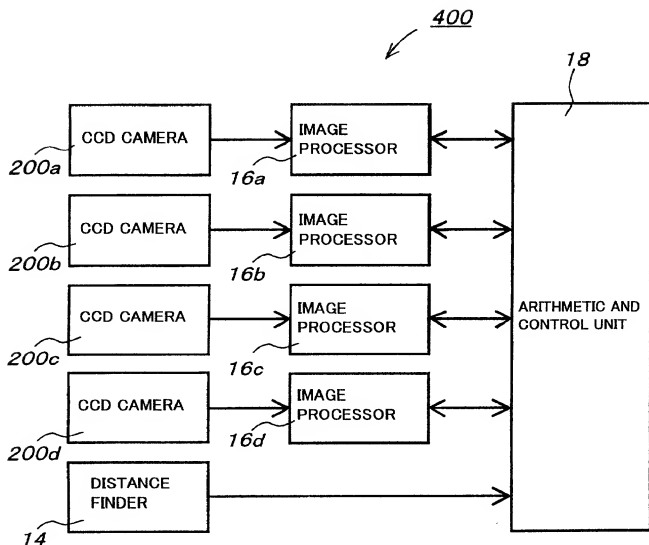


FIG. 11

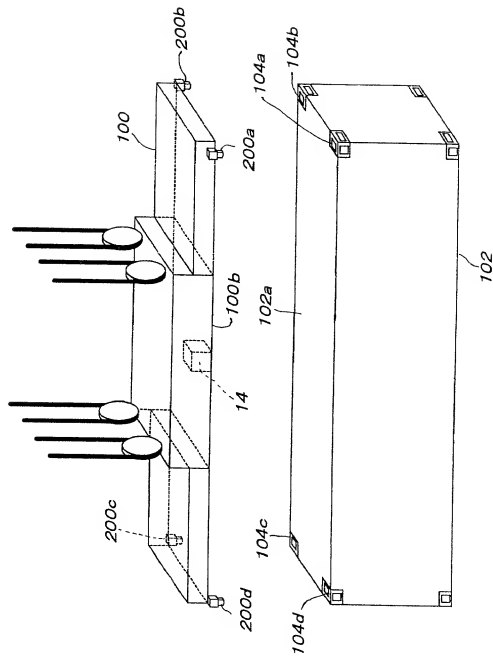


FIG. 12

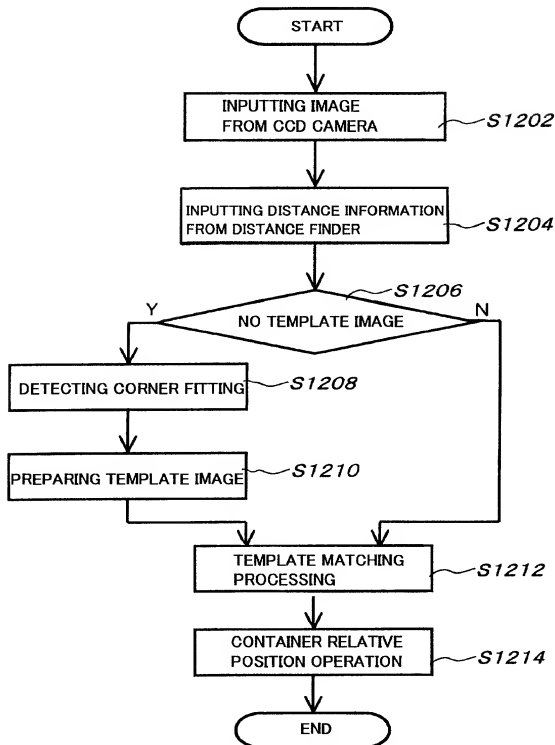


FIG. 13

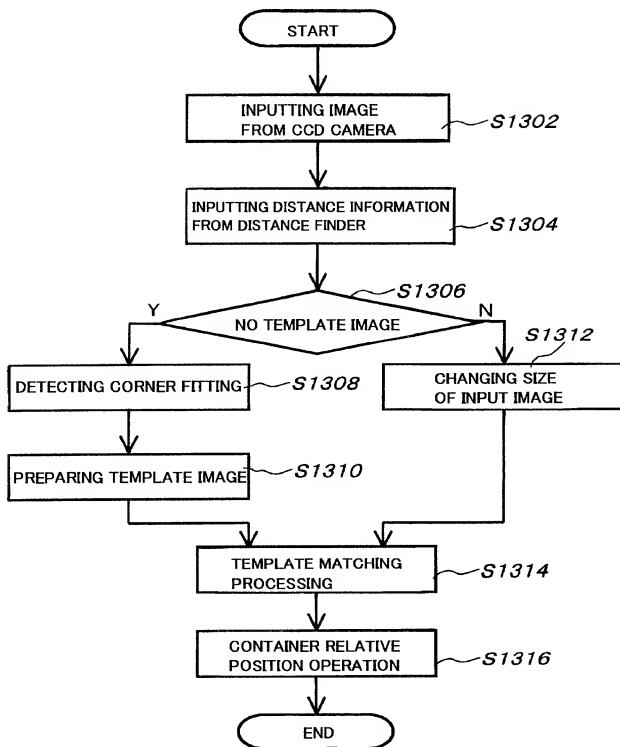
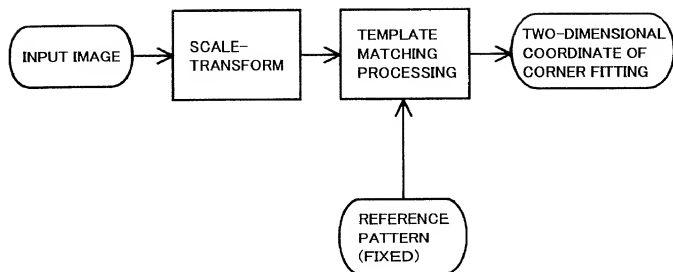


FIG. 14



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FIG. 15

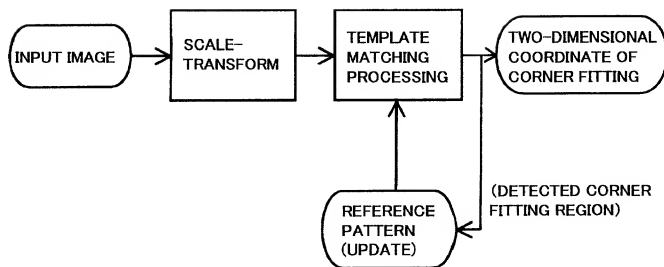


FIG. 16

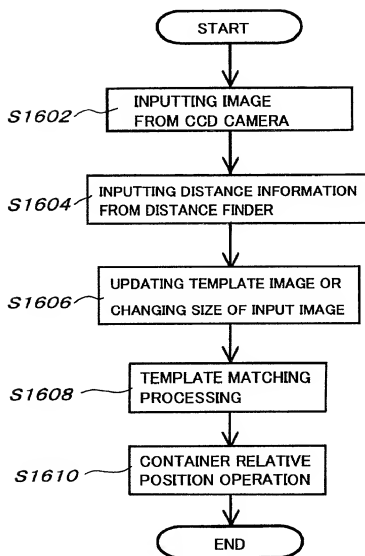


FIG. 17

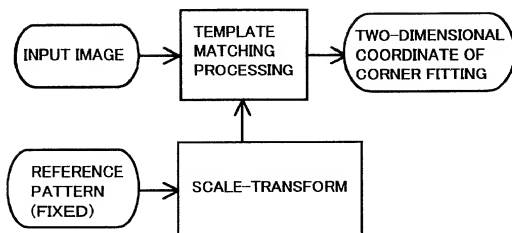
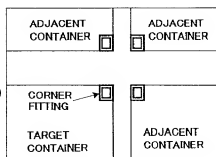
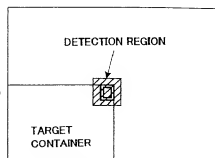


FIG. 18(a)



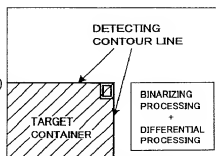
ORIGINAL IMAGE

FIG. 18(d)



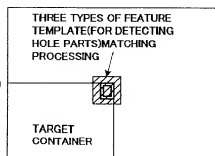
SETTING-UP OF
DETECTION REGION

FIG. 18(b)



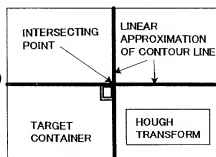
DETECTION RESULT ON
CONTAINER UPPER SURFACE

FIG. 18(e)



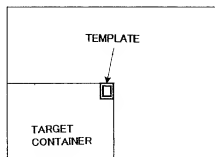
FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
MATCHING PROCESSING

FIG. 18(c)



RESULTS OF LINEAR
APPROXIMATION OF
CONTOUR LINE AND
INTERSECTING
POINT DETECTION

FIG. 18(f)



RESULT OF TEMPLATE
PREPARATION

FIG. 19(a)

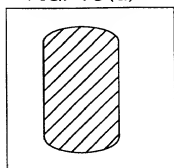


FIG. 19(c)

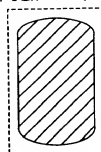
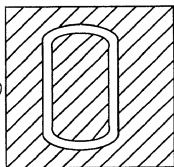


IMAGE DATA HAVING LOW
CONCENTRATION IN HOLE PART



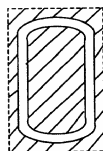
FIG. 19(b)



RESULT OF
DIFFERENTIAL PROCESSING



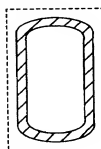
FIG. 19(d)



FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
IMAGE 2



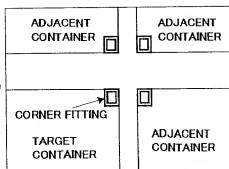
FIG. 19(e)



FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
IMAGE 3

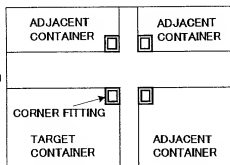
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FIG. 20(a)



ORIGINAL IMAGE

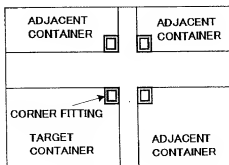
FIG. 20(b)



FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
MATCHING PROCESSING

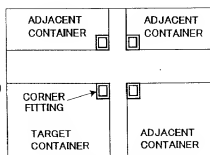
THREE TYPES OF FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
MATCHING PROCESSING
(WHOLE IMAGE DATA)

FIG. 20(c)



RESULT OF TEMPLATE
PREPARATION

FIG. 21(a)



ORIGINAL IMAGE

FIG. 21(d)

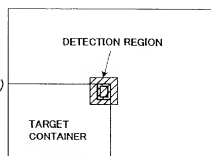
SETTING-UP OF
DETECTION REGION

FIG. 21(b)

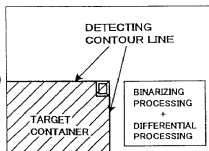
DETECTION RESULT ON
CONTAINER UPPER SURFACE

FIG. 21(e)

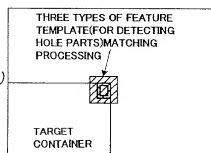
FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
MATCHING PROCESSING

FIG. 21(c)

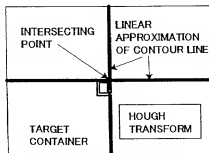
RESULTS OF LINEAR
APPROXIMATION OF
CONTOUR LINE AND
INTERSECTING
POINT DETECTION

FIG. 21(f)

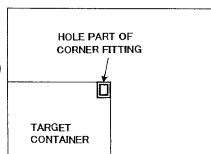
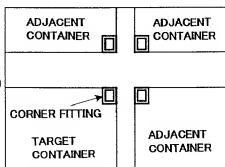
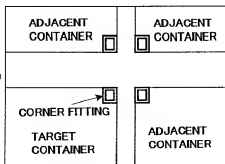
RESULT OF TEMPLATE
PREPARATION

FIG. 22(a)



ORIGINAL IMAGE

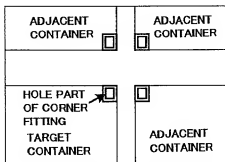
FIG. 22(b)



FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
MATCHING PROCESSING

THREE TYPES OF FEATURE TEMPLATE
(FOR DETECTING HOLE PARTS)
MATCHING PROCESSING
(WHOLE IMAGE DATA)

FIG. 22(c)



RESULT OF TEMPLATE
PREPARATION